AN MLEARNING JOURNEY: CRITICAL INCIDENTS IN TRANSFORMING PEDAGOGY

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Abstract

Blogs, wikis, Youtube, PODCasts, Social Networking (e.g MySpace, Facebook) and more recently Twitter have been the latest crazes to attract the attention of many of today's internet savvy younger generation. This generation are becoming our tertiary students. The emergence of these web 2.0 (or Social Software) tools has provided a media rich, yet simple to use, end user empowering environments that resonate with social constructivist pedagogies. Utilising these tools within tertiary education is one way to engage today's students. The appropriation of web 2.0 tools within social constructivist learning environments has been nick-named 'Pedagogy 2.0' (C. McLoughlin & M. Lee, 2008; C. McLoughlin & M. J. W. Lee, 2008). However, less than a billion people have access to computers, whereas around four billion people have access to mobile phones. Most web 2.0 tools are also designed to be mobile friendly, allowing reading and updating of web 2.0 content from mobile phones, and also featuring enhanced mobile affordances such as photo and video blogging (from cameraphones), and geotagging (from GPS equipped smartphones). Hence mobile web 2.0 provides a platform for wider access that is context independent, facilitating 'authentic' learning environments (A. Herrington & Herrington, 2007, 2006; Jan Herrington, Herrington, Mantei, Olney, & Ferry, 2009) beyond the boundaries of the traditional tertiary classroom. Thus mobile learning (mlearning) presents vast potential for appropriation within tertiary education. This paper presents an academics journey into the use and appropriation of mlearning within their teaching practice. This journey is based upon a four year research project into the potential of mobile web 2.0 (Cochrane, Flitta, & Bateman, 2009a). Critical incidents along this journey are identified and examples given of how mobile web 2.0 has been integrated into a Bachelor of Product Design course as a result of this journey. Examples of mobile web 2.0 scenarios are given, along with student and lecturer feedback. Lessons learnt during this mlearning journey will provide valuable insight to other educators wishing to explore these emerging tools within social constructivist learning.

Keywords - mlearning, social constructivism, Product Design.

1 INTRODUCTION

The paper outlines the significant events in the pedagogical development of two academics over a period of two years. Critical Incident Analysis is used to identify significant 'eureka' moments for the participants in their mlearning (mobile learning) journeys. Several 'lenses' are used to bring into focus themes that emerge upon reflection over this period, including: Communities Of Practice, the Social Construction of Technology, Actor Network Theory, Activity Theory, and Social Constructivism. The symbiotic relationship developed between the academic advisor (technology steward) and the academic lecturer has proven a rich environment for harnessing educational technology to design social constructivist learning environments for different groups of tertiary students.

1.1 MLearning Research Project

The projects described in this paper form one case study from a wider participatory action research project from 2006 to 2009 involving five different tertiary education contexts. The research project investigates the potential of mlearning to engage and guide todays learners in education by leveraging the use of mobile web 2.0 tools within collaborative, technologically rich social constructivist environments. This paper specifically investigates the journey of discovery undertaken by one of the course lecturers involved in the mlearning project from 2008 to 2009.

1.2   Defining MLearning

It is the potential for mobile learning to bridge pedagogically designed learning contexts, facilitate learner generated contexts, and content (both personal and collaborative), while providing personalisation and ubiquitous social connectedness, that sets it apart from more traditional learning environments. Mobile learning, as defined in this paper, involves the use of wireless enabled mobile digital devices (Wireless Mobile Devices or WMD's) within and between pedagogically designed learning environments or contexts. From an activity theory perspective, WMD's are the tools that mediate a wide range of learning activities and facilitate collaborative learning environments (Uden, 2007). The WMD's wireless connectivity and data gathering abilities (e.g. photoblogging, video recording, voice recording, and text input) allow for bridging the on and off campus learning contexts – facilitating "real world learning".

1.3   Interpretive Lenses

The following 'lenses' are used to interpret the critical incidents in the participants' mlearning journey.

A.   Critical Incident Analysis

Critical Incident Analysis records and evaluates incidents that facilitate a change in a learners understanding of a problem as either breakthroughs or breakdowns. Breakthroughs are incidents that produce productive change or important conceptual change. Breakdowns are incidents of technological difficulty or misunderstanding (Sharples, 2009).

B.   Communities Of Practice

Communities OF Practice (COPs) are formed by groups of people with a common interest who commit to a shared learning experience over a sustained period of time (Lave & Wenger, 1991; Wenger, 2005). In the surrounding research project, an intentional COP model was used for lecturer technological and pedagogical development followed by a secondary COP between the lecturers, their students, and the researcher investigating the use of mobile web 2.0 in their courses. One of the keys for the success of these intentional COPs was the inclusion in the group of the researcher as the 'technology steward' (Wenger, White, Smith, & Spa, 2005), guiding the group in its appropriation of mobile web 2.0 tools.

C.   Social Construction of Technology

The social construction of technology (SCOT) contends that technology usage and development is socially constructed and often follows un-intended or unexpected directions. The 'best' technology is therefore not necessarily the most successful or ultimately adopted by consumers. SCOT analyses the duality that society influences the development of technology, and technology influences society (W. Bijker, 1995). The impact of the choices of the social group created by the students and lecturers in this project demonstrates SCOT in action.

D.   Actor Network Theory

Actor-network theory (ANT) is an approach to analyse how technologies are developed and adopted as a volatile network of influential factors ('actors') that include both human and non-human actors. "An actor network, then, is the act linked together with all of its influencing factors (which are again linked), producing a network", Ole Hanseth cited by Ryder (2007). "The important fact here is not that humans and nonhumans are treated symmetrically, but that they are defined relationally as arguments or functions in the network, and not otherwise", Jay Lemke cited by Ryder (2007). "Methodologically, ANT has two major approaches. One is to 'follow the actor,' via interviews and ethnographic research. The other is to examine inscriptions", from Nancy Van House cited by Ryder (2007). Proponents of ANT include Latour (2005) and Law (W. E. Bijker & Law, 1992). ANT is closely related to SCOT.

E. Activity Theory

Activity theory conceptualises learning as a social activity with an objective that is mediated by the use of tools and is context dependent (Engestrom, 1987). In this project, mobile web 2.0 technology is not perceived as the object of learning but as a tool to support students' learning activities (Uden, 2007).

F. Social Constructivism

Social constructivism perceives learning as a social activity where the learners are involved in discovering knowledge together. Social constructivism is the learning paradigm that links and underpins all of the 'lenses' used to analyse the research participants mlearning journey. All of the interpretive lenses used herein can be broadly classified as social constructivist. The origins of the development of the concepts of social constructivism are attributed to Vygotsky (Vygotsky, 1978), however the concepts have been appropriated and developed by many recent educational theorists and aligned with the affordances of web 2.0 and mlearning (A. Herrington & Herrington, 2007; Jan Herrington, et al., 2009; J Herrington, Mantei, Herrington, Olney, & Ferry, 2008; C. McLoughlin & M. Lee, 2008; C. McLoughlin & M. J. W. Lee, 2008).

G. Critical Incident Sources

Several primary sources were used to identify critical incidents in the participants mlearning journey. A variety of mobile friendly web 2.0 social software tools were embedded into the project and their use investigated and developed throughout the length of the project. These include content generated by the participants and uploaded to the participants online blog/eportfolio (Vox), original video clips captured via the participants laptop webcam or smartphone camera, video streamed directly from the participants smartphone, audio recordings, photographs taken on the smartphones and uploaded to Flickr, Picasaweb and Vox. Technical and pedagogical support were integrated into a weekly Community Of Practice (COP) involving the researcher as the technology steward to guide the group (Wenger, et al., 2005), the course lectyrers (participants) and the course students. The COP sessions were a rich source of interactions among the participants. A Moodle support course was established to scaffold the COP capturing many of these interactions. Also, as the partnership between the participant and the researcher developed, a series of collaborative research outputs based upon the mlearning project were co-authored. These research outputs feature reflections from the participants on the impact of the mlearning interventions in their courses, their teaching practice, and daily personal routines. A number of collaborative workshops and presentations were also developed and are captured on a series of wiki pages and video recordings of the events. Finally, the researcher kept a reflective journal throughout the timespan of the research project, which has provided primary source material of ciritcal incidents as interpreted at the time by the researcher. Thus a rich source of data is available for interpretation.

The following elements are used to critique the identified critical incidents:

Table1: Critical Incident Elements.

Date	Date of the identified critical incident
Critical Incident	Description of the identifed Critical Incident: Breakthrough or Breakdown?
Actors	Who were the influencing Actors in this incident?
Activity	What activity occured as a result

Inscription	Supporting or triggering texts or media
	    o Paper/Conference
	    o Wiki

	o YouTube Video
	o Blog post

1.4   Principal Actors

A.   The Researcher

Thomas Cochrane (BE, BD, GDHE, MTS, MComp) is an Academic Adivsor (elearning and Learning Technologies) with Unitec (March 2004 to present). His role at Unitec includes providing support for elearning and learning technologies for Unitec teaching staff, and pushing the boundaries of educational technology for enhancing teaching and learning at Unitec. His research interests include mobile learning, web2, and communities of practice. He is currently implementing mobile learning trials for his PHD thesis: "Mobilizing Learning: The potential impact of wireless mobile computing on teaching and learning in higher education in New Zealand". Harnessing the potential of social software tools (such as: Mobile Blogging, RSS, Instant Messaging, Moodle and Elgg…) using wireless mobile devices, such as: PDAs, laptops, and the new generation of mobile phones.

B.   The Course Lecturer

Dr. Isaac Flitta is a Senior lecturer, School of Design, Unitec New Zealand, Auckland, New Zealand. e joined UNITEC at the beginning of 2008 from Bournemouth University in the UK. He lead different Design Programmes and was involved with teaching design courses in different programmes at both undergraduate and postgraduate level. He is currently a senior lecturer and Programme Director for the Bachelor of Product Design at UNITEC. He was also responsible for the final year undergraduate project supervision, as well as dissertation supervision at Masters level and more recently supervision of a PhD thesis. Isaac has been a key member of a number curriculum development teams both at Bournemouth University and UNITEC New Zealand and led the development of a number of Design Programme Courses.

2   ISAACS MLEARNING JOURNEY

2.1   A New Beginning

Prior to joining Unitec as a lecturer, Isaac had no prior experience of using web 2.0 or mlearning tools as part of his teaching practice. Upon joing Unitec, Isaac was invited to join the mlearning project planned for the year with the third year Bachelor of Product Design students, the researcher as the technology steward and Roger the course lecturer. Roger had been working with the researcher for two years already investigating the integration of web 2.0 and then mobile web 2.0 tools within the course curriculum to engage students and create a flexible student-centred learning environment.

Date	20th February 2008
Critical Incident	Invitation to join the 2008 mlearning project
Actors	The Researcher, Isaac, Roger (Isaacs colleague), N95 smartphone
Activity	Introduction of the principal actors to one another and the beginnings of a peer support network and induction into mlearning
Inscription	Photo of event captured on Rogers N95 and uploaded to Vox http://ondesigno.vox.com/library/photo/6a00f48cdf734b000300f48ce1e5e90003.html Rogers Vox: http://ondesigno.vox.com Isaacs Vox: http://iflitta.vox.com Researchers Vox: http://thomcochrane.vox.com

The researcher met with the Bachelor of Product Design lecturers – Roger & Isaac, and discussed the mlearning project and the various ways of course integration and how to engage the students to

adopt the technology within a social constructivism paradigm. It was a positive meeting, all participants were excited about the potential 'full integration' with the programme in 2009, and brainstormed how to allocate students to the project as resources were limited to eight Nokia N80 smartphones for students and two N95s for the lecturers plus bluetooth folding keyboards for faster text entry. It was decided that to participate, students must accept a commitment of weekly technology session (COP) plus a \$20/month You Choose voice plan, but were to be reimbursed for the cost of a 1GB per month 3G data plan. Roger and Isaac to get project paid voice and data accounts each. Isaac was excited about using the N95 smartphone, which at the time was cutting-edge smartphone technology. The lecturers were also interested in the possibility of research outputs based upon the project. Roger and Isaac created their own Vox blogs and met with the researcher to learn how to blog directly from their N95 smartphones. However, during the first week of using the N95s, both Roger and Isaac managed to lock out their SIM cards by entering the security code for their N95's wrong. Isaac needed a new SIM card. The first technological hurdle ('breakdown') did not dampen the participants' enthusiasm for the project.

2.2 Mlearning Community Of Practice

Date	4th March 2008
Critical Incident	Formation of a weekly Comounity Of Practice involving the Bachelor of Product Design third year students, Isaac, Roger and the researcher (as technology steward)
Actors	The Researcher, Isaac, Roger, Third Year Bachelor Product Design Students, N95s, Moodle course, Vox
Activity	COP formation
Inscription	Moodle support course for the COP http://moodle.unitec.ac.nz/course/view.php?id=38 Photo of first COP participants recorded on Isaacs N95 and uploaded to Vox http://iflitta.vox.com/library/photo/6a00f48cdf618d000300f48ce309460002.html

The creation of a supporting Community Of Practice for the project created a sense of excitment and community among the participants. The mlearning project participants (students, lecturers, and the technology steward) meet once a week face-to-face for an hour, discussing issues and ideas regarding the mlearning tools. However, due to the time demands of moving to a new country, starting a new job, and filling in as programme director as the courses programme director took a lecturer exchange with Limerick university in Ireland, Isaacs involvement in the COP became sporadic. However, the day to day experiences in using the technology, that can be initially described as trial-and-error experiments, as he confronted those challenges and problems on the job are rich sources of learning and produced new knowledge and developed new insights.

2.3 First Attempts at Pedagogical Integration

Date	26 June 2008
Critical Incident	Mlearning project instigated in second year of BDes
Actors	Isaac, researcher, second year lecturer, second year Bachelor of Design students, QRF fund, N95s, Vox
Activity	First attempt at introduction of mlearning to second year Bachelor of Product Design.
Inscription	Researcher's Flickr photos and research journal http://farm4.static.flickr.com/3144/2611625607_99f982a61d_b.jpg

The success of the first semester mlearning project with the third year Bachelor of Product Design students led to a successful bid for increased research funding to extend the project into the second and first year Bachelor of Product Design courses as well. Isaac managed the ontroduction of the

mlearning project into the second year of the Bachelor of Product Design, however the lecturer responsible for the second year assessments for semester2 2008 did not get onboard, and therefore the project was entirely voluntary without any specific course integration, unlike the third and first year projects. While the students began the project enthusiastically, and integrated the use of the mobile web 2.0 tools into their personal workflows, there was little integration into the second year course itself. As a result, Isaac focused on the integration of mobile web 2.0 into the second semester of the third year course, specifically the New Product Commercialisation (NPC) project (as below).

Date	July 2008
Critical Incident	Integration of mlearning into Isaacs semester2 2008 NPC course
Actors	Isaac, Researcher, Third year Bachelor of Design students, N95s, Vox, Google Docs
Activity	Collaborative course assesment modification
Inscription	Course assesment outline on Google Docs http://docs.google.com/View?id=dchr4rgg_15fxjk7jcj NPC Surveymonkey feedback http://picasaweb.google.com/thomcochrane/NPC2008Feedback?feat=directlink

The NPC (New Product Commercialisation) paper in semester2 of 2008 was an opportunity to integrate the use of web 2.0 and mlearning tools into Isaacs teaching approach. Collaborating with the researcher, the NPC Project deliverables criteria were re-written from the traditional paper-based booklet (http://docs.google.com/View?id=dchr4rgg_18hr5jzff2) to a media-rich blog/eportfolio integrating mobile web 2.0 tools (http://docs.google.com/View?id=dchr4rgg_15fxjk7jcj). Feedback from students gathered by an online Surveymonkey form (http://picasaweb.google.com/thomcochrane/NPC2008Feedback?feat=directlink) was very positive.

The NPC course assignment focused upon a group project and required multiple participations from all students. Using a blog as a mean of communication, the students were tasked to write a synopsis of the article followed by his or her own interpretation of the points raised in the article (i.e. 500 words per post). The synopsis and comments were published in a blog along with a link to the original article either as a web-link or magazine's reference for the submission. Collaboration and interaction between group members were important aspects of the project. Therefore each student had to work with their group to refine their chosen article and add any additional comments on it using the 'comments' feature of each other's Blogs. The article was then presented weekly. It was expected that each member of the work-group is familiar with the article and be able to assist the author in reporting back.

Once a project is created and mobile web 2.0 technology is embedded in the context of a course, the lecturer often finds himself/herself responsible for supporting the resulting posting. While this may not pose a significant problem at the first or even the second time it occurs, it can be difficult to manage over the course of a year. It was important, that the lecturer (Isaac) provide the support needed on the type, scope, size, and pedagogical input of the technological aspects that are introduced into course. This requires a change in time management and a refocus on regular formative feedback rather than the traditional summative end-of-project feedback and assessment procedures. When this is implemented the benefits for students and tutors in being continuously engaged in the projects is realised, creating much lower reliance upon end-of-project presentations and summative assessment. Therefore lessons learnt included the importance of regular formative feedback on the student blogs by the lecturer, and the amount of time required to manage the information from an entire class of blogs. Strategies for managing this were thus developed for the 2009 projects.

2.4 Personal Appropriation

Date	22 August 2008

Critical Incident	Reflective VODCast
Actors	Isaac, researcher, N95
Activity	COP participants were asked by the researcher to reflect upon their use of the smartphones and Vox eportfolios and upload these reflections as a VODCast (video recording) to either Vox or YouTube.
Inscription	Isaac and N95 http://picasaweb.google.com/lh/photo/lPE-7iyJEONSkei8g2ms_g?feat=directlink Isaac VODCast1 http://www.youtube.com/watch?v=opJN_N86ou0

Isaac appropriated the use of the smartphone (Nokia N95) and the folding bluetooth keyboard into his daily personal workflow, often carrying the N95 and folding keyboard on campus instead of his laptop. Isaac became 'inseperable' from his N95, using it for various forms of communication and as his main connection to the Internet. When asked by the researcher to record and short video reflection on the use na impact of the mlearning project, Isaacs reflection: "I use Skype a lot, MSN for IM to chat, I carry the keyboard all the time, and the connection at Unitec is so slow I use 3G to connect to the Internet all the time! I also use the phone camera to take photos and videos on a regular basis."

2.5   Connectivity

Date	November 2008
Critical Incident	Isaac uses 3GB of data on a 1GB plan, ending up with a $900 excess usage bill
Actors	Isaac, N95, Vodafone
Activity	Excessive 3G data usage
Inscription	Project Vodafone bill

The smartphone (N95) provided ubiquitous connectivity, whic Isaac utilised to its full potential both on and off campus. 3G connectivity was significantly faster than the WiFi Internet connection on campus (when shared amongst over 9000 users), and provided Isaacs sole Internet connection at home. Students ran comparisons between streaming YouTube videos on their smartphone over 3G and on their laptops via the campus WiFi. The 3G connection was demonstrably faster. Consequently students and Isaac used their smartphones as a preferred modem for their laptop connectivity as well as on the mobile itself. While students were careful to monitor their 3G data usage, Isaac was not so diligent until receiving the excess usage bill. Following this Isaac invested in wired broadband for home usage. The smartphone certainly bridged the gap between his understanding of the nature of the technology and his ability to recommend tools to enhance students' learning.

2.6   Collaborative Research

Date	15-17 February 2009
Critical Incident	DesignIX Conference research publication based upon reflection, feedback on the NPC mlearning project.
Actors	The researcher, Isaac, Roger
Activity	Collaborative research publication
Inscription	Powerpoint presentation on Google Docs http://docs.google.com/present/view?id=dv83r4v_1gft3hrdx&interval=5

| | Collaborative research paper (Cochrane, Bateman, & Flitta, 2009; Cochrane, Flitta, et al., 2009a) |
| | Isaacs N95 photos uploaded to Vox |

The researcher and the two third year Bachelor of Product Design lecturers agreed to collaborate on research outputs reflecting on the mlearning project. Two international conferences with options for publishing in associated journals were chosen by Isaac. Writing and presenting the paper (In Berlin, Germany) provided a catalyst for reflection on the mlearning project. Isaac recognised the immense learning potential in using the technology in his day to day experiences as a lecturer. By his own admission he always placed a higher value on action than reflection in his approach to the project, however, writing and presenting the paper at a conference provided an ability to pause and reflect. This was a critical breakthrough incident for Isaac, as the research for the paper and presentation provided conceptual foundations for understanding the affordances of mobile web 2.0, and positioned the research internationally. Presenting and writing became a powerful vehicle for Isaac to produce insights of the process. The initial writing of the research papers was done at the end of 2008 and then submitted to the conferences for peer review.

Date	20-24th April 2009
Critical Incident	ANZAAE Conference research publication based upon reflection, feedback on the NPC mlearning project. Isaac realises he is only now beginning to understand the mlearning project concepts.
Actors	The researcher, Isaac, Roger
Activity	Collaborative research publication
Inscription	Powerpoint presentation on Google Docs http://docs.google.com/present/view?id=0AQUpkDyjfVwCZHY4M3I0dl82OWdqMzJiNmYy&hl=en_GB Isaacs N95 photos uploaded to Vox Research paper on Google Docs http://docs.google.com/fileview?id=0BwUpkDyjfVwCYWNjZTBjYTAtZDExMy00OTE4LWFjMzMtY2NmZDg2MmU1OTEw&hl=en_GB (Cochrane, Flitta, & Bateman, 2009b)

The ANZAAE Conference presentation and research paper provided a further opportunity to reflect on the experiences of integrating mobile web 2.0 within the Bachelor of Product Design course. The conference also allowed Isaac to call a halt, at least briefly, to his pace of action and engage in processes that permitted him to reflect upon important areas such as the students future learning needs. This facilitated deeper conceptual development of the pedagogical strategies for implementation and affordances of mobile web 2.0. The development formed part of the technology trend toward greater student involvement and staff participation. These new developments placed more emphasis on the need to reflect on prior usage of the technology over the course of a year or longer, the skills applied in that reflection were then used to plan for improvements in the following year.

2.7   2009 Mlearning Plan

Date	16th March 2009
Critical Incident	Planning the integration of mlearning into the course for 2009
Actors	The researcher, Isaac, the curriculum
Activity	Collaborative writing of course assesment criteria

Inscription	Semester1 project outlines on Google Docs - ManTech, CAD
	http://docs.google.com/View?id=dv83r4v_33f89b4fhm
	http://docs.google.com/View?id=dv83r4v_31cp27kvhb

The researcher and Isaac met regularly (usually over coffee) to discuss the integration of the mlearning project into the Bachelor of Product Design course for 2009. Google Docs was used to collaboratively develop two course projects for semester1. The experiences of the 2008 NPC project informed the 2009 pedagogical design.The core activities included the integration of students Vox blog/eportfolios and the use of Google Docs. To facilitate movement towards a sustainable implementation model, students were not reimbursed the cost of 3G data in 2009, but were still supplied with the use of high-end smartphones to use as if they owned them for the duration of the course. As a result, several 2009 third year students declined to take part in the mlearning project, which was disappointing for all concerned. Second and third year Bachelor of Product Design students are expected to purchase their own wireless laptop for use in the course, however first year students are not. Therefore the 2009 mlearning project investigated the affordances of firstly introducing the first year students to the use of wireless netbooks and web 2.0, before introducing the use of smartphones later in the year.

2.8 Interim Technology Update

Date	May 2009
Critical Incident	Lecturers updated with Nokia Xpressmusic 5800 touchscreen smartphone
Actors	XM5800
Activity	Setup of the Nokia Xpressmusic 5800 smartphone
Inscription	Discussions over Coffee with the researcher
	Researcher Journal

The success of the third year mlearning project in 2008 led to a successful bid for internal institutional funding to purchase new smartphones for all the students and lecturers in the Bachelor of Product Dsign course in 2009. Nokia N97 smartphones were ear-marked for the third year students and lecturers as the 'flagship' project for the course. However the N97s were unavailable in New Zealand until July 2009, therefore the students were initialy suplied with the N95s from 2008 as an interim measure. Meanwhile, a wider mlearning project implementation involving 200 smartphones was approved for project s throughout Unitec in 2009. The Nokia Xpressmusic became available in July 2009, and these were issued to the Bachelor of Product Design lecturers to get them familiar with the new interface before rolling the devices out to students. The archilles heel of the XM5800 is the quality of the built-in camera, therfore Isaac and Roger contiunued to use the N95 for capturing images.

2.9 Conceptual Development

Date	May 2009
Critical Incident	Refining the 2009 plan for semester 2 projects
Actors	The researcher, Isaac, XM5800, Vox, Google Docs, students, the curriculum
Activity	Development of semester2 mobile web 2.0 integration into the curriculum
Inscription	Brainstorming discussions with the researcher
	Semester2 project outlines on Google Docs – MIP2, NPC2
	MIP2 (First year project) http://docs.google.com/View?id=dv83r4v_174c726jdv
	NPC2 (Third year project) http://docs.google.com/View?id=dv83r4v_8ddxfbkfg

The technological and pedagogical support model for the mlearning projects continued to be a weekly COP with the researcher, the lecturers and the students. Unfortunately Isaac was unable to regularly attend these COP sessions, therefor regular one-on-one discussions with the researcher and Isaac (usually over coffee) became very important in the development of the project integration and implementation in 2009. These discussions formed the basis for brainstorming course projects led by Isaac within both the first and third year classes in semester2 of 2009. The use of Google Docs to facilitate this collaborative development was by now second nature and it became part of his teaching practices. Many of the web 2.0 tools he used in his teaching and practice formed part of the processes of reflection.

2.10 Technology Update

Date	July 2009
Critical Incident	Lecturers and third year students updated with Nokia N97 smartphones
Actors	The researcher, Isaac, Roger, third year students, N97
Activity	Update of smartphones from N95/XM5800 to Nokia N97
Inscription	Discussions over Coffee with the researcher Research Journal

The Nokia N97 smartphone became available for purchase in New Zealand in July 2009. Research funds were used to purchase a class set of N97s and third year students and lecturers were upgraded to the N97 smartphone. The N97 was the first Nokia touchscreen smartphone with all the best functionality of previous the models integrated (i.e. built-in keyboard, high resolution camera, large memory and storage, GPS wih built-in geotagging etc…). Effectively a mini-laptop, the N97 was highly valued by the students and lecturers in the project. Isaacs prized N95 and folding bluetooth keyboard were finally retired from operation in favour of the all-in-one N97. The introduction of the N97 re-invigorated the 2009 third year mlearning project and course inetgration, and was another critical motivational incident in Isaacs mlearning journey.

2.11 Scaffolding Mlearning Integration

Date	August 2009
Critical Incident	Reflecting on the successes and failures of the 2009 mlearning integration accross all three years of the Bachelor of Product Design course, and planning for 2010.
Actors	The researcher, Product Design lecturers, first, second, and third year students, institutional strategy, course curriculum.
Activity	Reflecting on 2009 and beginning planning for 2010 mlearning integration
Inscription	Brainstorming discussion with the researcher Vision statement on Google Docs Newly developed draft institutional eLearning Strategy integrating mlearning and COPs for scaffolding and professional development.

As the second semester of 2009 reaches its mid-point, the future directions of the mlearning project integration into the Bachelor of Product Design are being discussed by the researcher and the course lecturers. The enthusiastic response from students to the staged integration of the mlearning project into the first year of the course points the way forward. Scaffolding the setup of students web 2.0 online accounts using a wireless netbook removed dependence upon fixed computer laboratories and non-collaborative learning spaces. The later introduction of smartphones to the first year course was thus less stressful as students and lecturers were by then conversant with the web 2.0 tools that were emhanced by the unique affordances of the smartphones (mobility, context-independent and yet

context-aware, geotagging, barcode recognition, video streaming, communication etc…). As the lecturers confidence and personal appropriation of the tools grew, so their ability to conceptualise the possible integration scenarios grew as well. Isaac is now a mobile web 2.0 'evangelist' rather than merely an enthusiast.

3 DISCUSSION

3.1 Lessons Learnt

The various mlearning trials undertaken have illustrated that pedagogical integration of mlearning into a course/curriculum requires a paradigm shift on behalf of the lecturers involved, and this takes significant time. Hameed (2009) describes this process as a "cultural re-alignment". Therefore the integration of the mobile web 2.0 technologies into lecturers' daily workflow and integration into course activities and assessment are critical success factors, as is the establishment of a collaborative learning environment. An intentional Community Of Practice model (Langelier, 2005) has been found to be effective for guiding and supporting the mlearning roll-out. Scheduling explicit times for explicit reflection on the integration of mlearning into the course by collaborating on peer-reviewed research outputs based on the project have also been critically important. Students also require significant time to gain the skills required to maximise the potential of new and emerging web 2.0 tools – as our pre-trial surveys indicated, few students were already using these tools for their own content creation before the trial. Immersing students within a social constructivist pedagogical environment can be a new and challenging experience for the students, therefore implementation requires planned staging and scaffolding to support student learning (Cochrane, 2010). Based upon these experiences, in order to achieve an explicit move to a social constructivist learning environment using mobile web 2.0 tools within the course, a staged, and scaffolded approach across the three years of the programme will be adopted.

4 CONCLUSIONS

The paper has outlined and critiqued the journey of two academics integrating the use of mobile web 2.0 tools within a tertiary education course. One of the academics is an academic advisor and the principal researcher in the mlearning project, while the other is a senior lecturer in the course. This collaborative partnership has been invaluable in facilitating both conceptual and pedagogical transformation within the course, facilitating the movement to a flexible social constructivist teaching and learning environment. The use of several interpretive 'lenses' has provided a framework to critique and map this journey via a series of identified and recorded critical incidents. Looking back over this journey allows us to see how far we have progressed, and where more reflection and work is needed for future development as the journey continues.

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